ROYAL CANADIAN AIR FORCE

AVIATION ROYALE CANADIENNE

“Do’s” & “Don’ts” in Airfield Concrete Pavement Design and Construction

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DON'Ts

Lessons learned from past projects

Use of Poor Quality Aggregates

- Poor aggregate quality → material related distress
- QA/QC testing is key

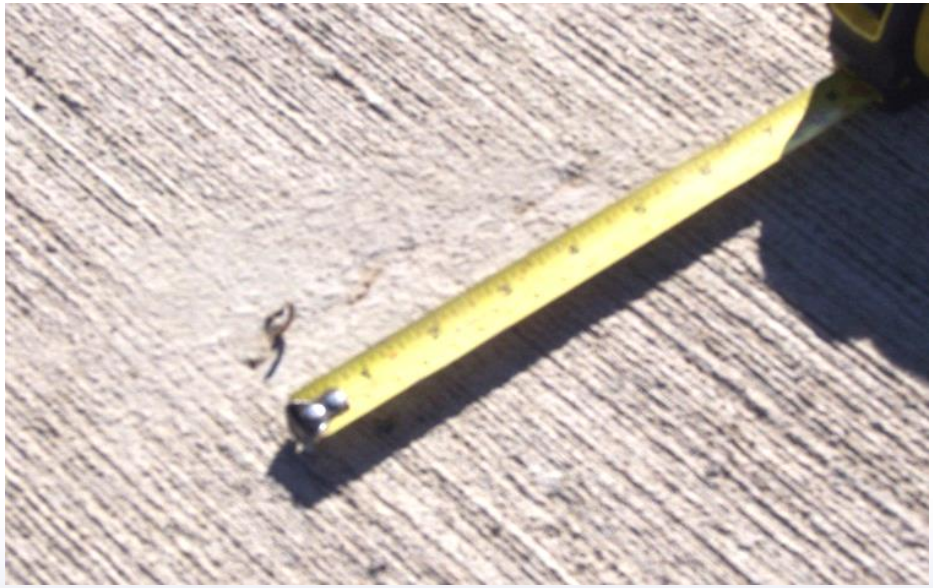
Popouts

Alkali Silica Reactivity (ASR)

Durability cracking

Lack of QA/QC in Aggregate Production/Stockpile Management

- Stockpile management
  - Segregation
  - Contamination → paved stockpile site
- Aggregate production
  - Quarry/pit materials change over time



Inadequate Consolidation

- Lightweight finishing equipment
- Defective vibrators
- Poor mix design

Poor Finishing Techniques

- Excessive hand finishing

Poor Finishing Techniques

- Adding water to the surface to aid finishing
- Adding concrete to the surface to correct edge slump or surface deficiencies

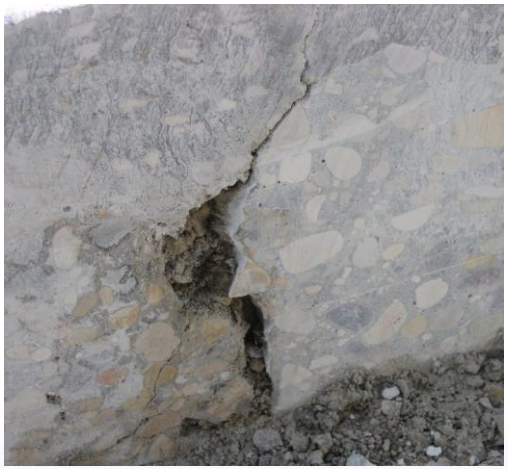
Lack of Protection

- Weather factors
  - Wind → protective screens
  - Hot weather → night paving
  - Cold weather → insulated blankets
  - Rain → plastic sheeting

Incorrect Joint Design - Keyways

- DND standard until about 2004
- Difficult to construct → poor consolidation

Keyway/joint failure



Late Sawcutting

- Leads to uncontrolled cracking

Poor Joint Construction

- Lack of survey control
- Carelessness

Inadequate Clean-Up

- Sawcut slurry must be removed

Construction Related Damage

- Construction traffic → min. 70% strength
- Risks associated with slab removal

Be cautious and protect adjacent edges!

Mix Design Issues

- Rapid or slow strength gain
- Shrinkage cracking
- Edge slump
- Finishing difficulties → tearing/voids in the surface

DOs

Measures that promote quality.

Insist on a QC Plan

- QC Plan
  - Provides assurance the contractor intends to produce high quality concrete
  - Providers an opportunity to address potential deficiencies before paving

Proofrolling

- Standard Transport Canada airfield proofroller
  - 41,000 kg; 4 tires at 0.6 MPa
  - Aids compaction and helps locate soft spots

Mandatory Trial Batch, Trial Lane, and Pre-Pave Meeting

- Trial Batch
  - Check mix proportions & plant performance
- Trial Paving Lane
  - Check Contractor's ability to meet spec requirements → sets job standard
- Pre-Pave Meeting
  - Discuss paving plan and address potential issues

Use an On-Site Batch Plant

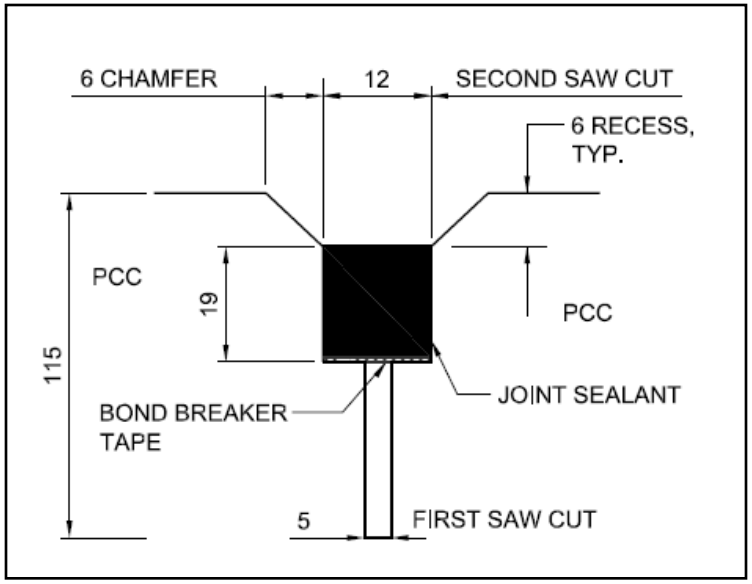
- Mandatory for large paving projects
  - Key to good consistency in mix workability and delivery
  - Eliminates need for concrete mixer trucks

Slip-Form vs. Fixed-Form Paving

- Slip-Form
  - Use wherever practical
  - Better consolidation
  - Less hand-finishing → greater surface durability
- Fixed-Form
  - Use only for small jobs, irregular panels

Joint Design

- Use chamfered joints
- Eliminate the backer rod



Mix Design

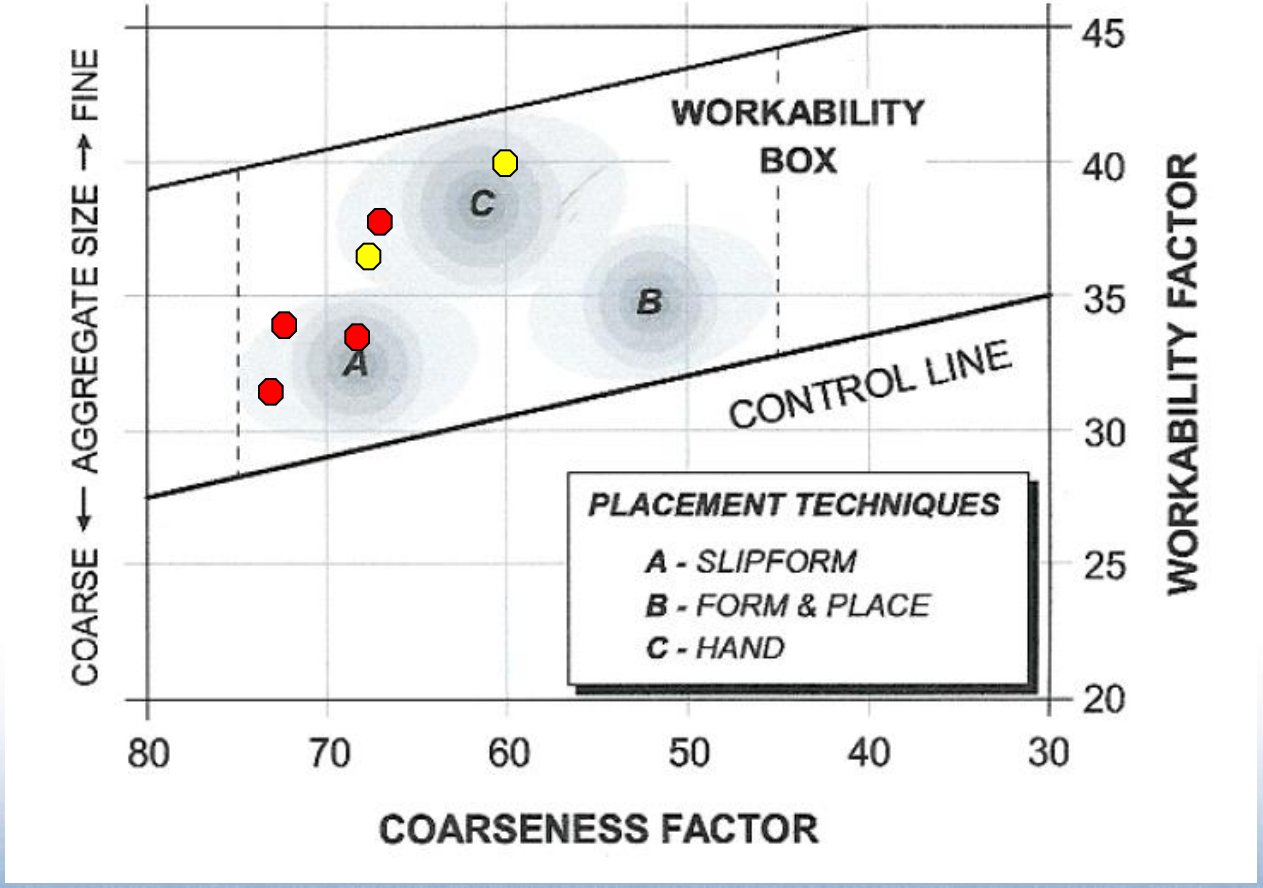
- Use petrographic testing to help determine aggregate quality
  - Petrographic Number → 125 max.
- Transfer greater responsibility to the Contractor
  - Aggregate size → max. 40 or 28 mm
  - Slump → don't specify

} Let the contractor decide

Aggregate Proportioning

- Use combined gradations to check workability
  - Coarseness Factor = 100 x (% Retained above 9.5 mm sieve) / (% Retained above 2.36 mm sieve)
  - Workability Factor = % passing 2.36 mm sieve

- Slip form
- Fixed form



Pay Adjustments

- Pay adjustments for strength, thickness and smoothness
- Advantages
  - Provides a means to separate good or bad work from “average”
- Disadvantages
  - Pay adjustment procedure confusing
  - Contractors aren’t “aiming” for it
  - Unable to find the right balance → don’t want to reward or penalize “average” workmanship

Questions?